



Development of a Production-Feasible, Common Rail Fuel Injection System for Liquid Dimethyl Ether (DME) for Use in Heavy-Duty Vehicles

Subcontractor

AVL Powertrain Engineering, Inc.

Principal Investigator

Jim McCandless
AVL Powertrain Engineering, Inc.
41429 Vincent Court
Novi, MI 48375
(810) 477-1203

DOE Project Manager

Steve Goguen
U.S. Department of Energy
CE-332, MS 6A-116/Forrestal
1000 Independence Ave., SW
Washington, DC 20585
(202) 586-8044

NREL Technical Monitor

Chris Colucci
NREL
1617 Cole Boulevard
Golden, CO 80401
(303) 275-4478

Subcontract Number

ACI-5-15107-02

Performance Period

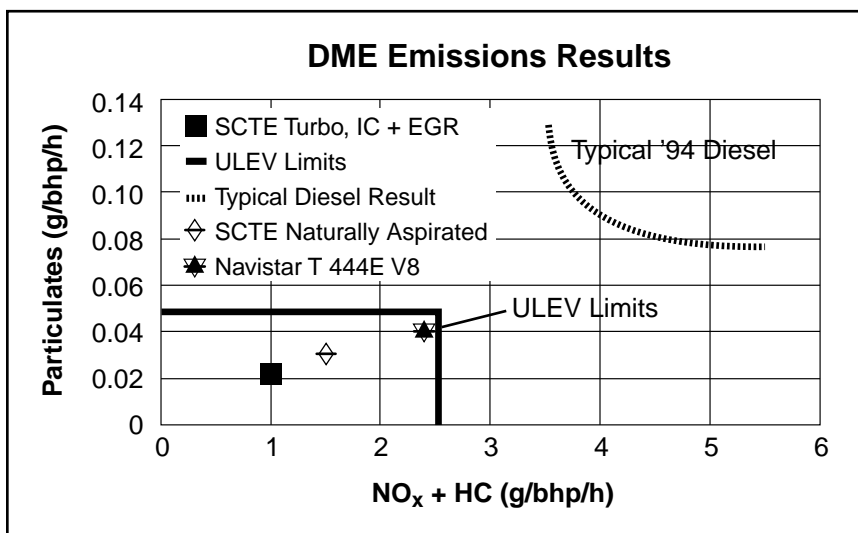
10/9/95–1/9/97

NREL Subcontract Administrator

Scott Montgomery (303) 275-3193

Objective

- To develop a production-feasible, common rail fuel injection system for DME for use on heavy-duty vehicles
- To demonstrate diesel equivalent energy efficiency at emissions levels well below all currently proposed regulations. Program emissions goals are 1.5 g/bhp-h for NO_x and 0.05 g/bhp-h particulates.



DME emissions results for single cylinder test engine (SCTE) and Navistar T444E V8 engine

Approach

Previous work performed by Amoco Corporation, AVL Powertrain Engineering, AVL List GmbH, and Navistar showed that very low exhaust emissions and diesel energy efficiency can be achieved on diesel engines fueled with DME. This work also showed that a special, low-pressure injection system is necessary for optimum performance and emissions.

AVL Powertrain Engineering, Inc., will design, simulate, and produce a novel, common rail fuel injection for DME. Its design will incorporate many production components, including an axial piston type fuel supply pump, 17-mm pintle type nozzles, and high-performance solenoid valves. The system will be bench tested and optimized, then installed on a Navistar DTA 530 engine for development, demonstration, and emissions testing.

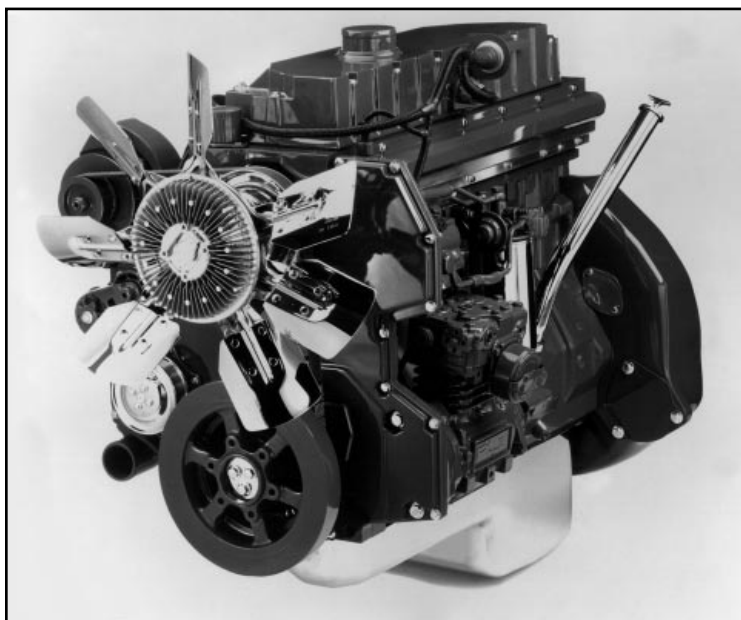


Accomplishments

The fuel injection system design and simulation work is complete. Computer simulation results indicate the system will perform as expected. We are now procuring components and expect to begin bench testing soon.

Future Direction

When the injection system is successfully developed and the emissions demonstrated, we will undertake a field test demonstration in heavy-duty trucks. Details have not been finalized.



Navistar DTA 530 engine for DME fuel injection system demonstration